A 3D molecular model of a cell with various organelles and molecules. The background is a light blue gradient. In the foreground, there are several DNA double helices in yellow and blue, a large blue sphere representing a nucleus, and a pink ribbon structure representing a protein. The text is overlaid on this background.

Division of Molecular and Cellular Biosciences (MCB)

Virtual Office Hours

Welcome!

We will begin at 2pm ET



Questions and Answers

Submit your questions via the Q&A box on your screen

- You may elect to submit your question anonymously.
- For specific questions about your project, please contact a Program Director.

Next MCB Virtual Office Hours

May 10th, 2023: Faculty Early-Career Development Program (CAREER)

June 7th, 2023: Let's Talk Broader Impacts

National Science Foundation



MCB Virtual Office Hour

Today's Topic:

How to Write a Great NSF Proposal

Richard Cyr - rcyr@nsf.gov

Slides and recordings of past presentations at

<https://mcbblog.nsfbio.com/office-hours/2/>

(Example: August 10, 2022 – Working with an NSF Program Director)



National Science Foundation

- Funding for basic research and education across all STEM disciplines since 1950.
- Supports 24% of all federally-funded basic scientific research.
- **FY23 at a glance:**
 - Budget: \$10.9 billion
 - ~39,000 proposals
 - ~11,000 competitive awards to ~352,000 scientists, educators and students
 - Overall funding rate of 28%

NSF Organization – 8 Directorates and 2 Offices



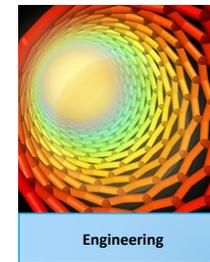
*



*



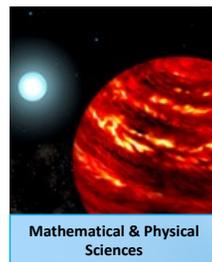
*



*



*



*



*

New!



*



*

* Fund biological research projects



NSF Merit Review Criteria

Intellectual Merit:

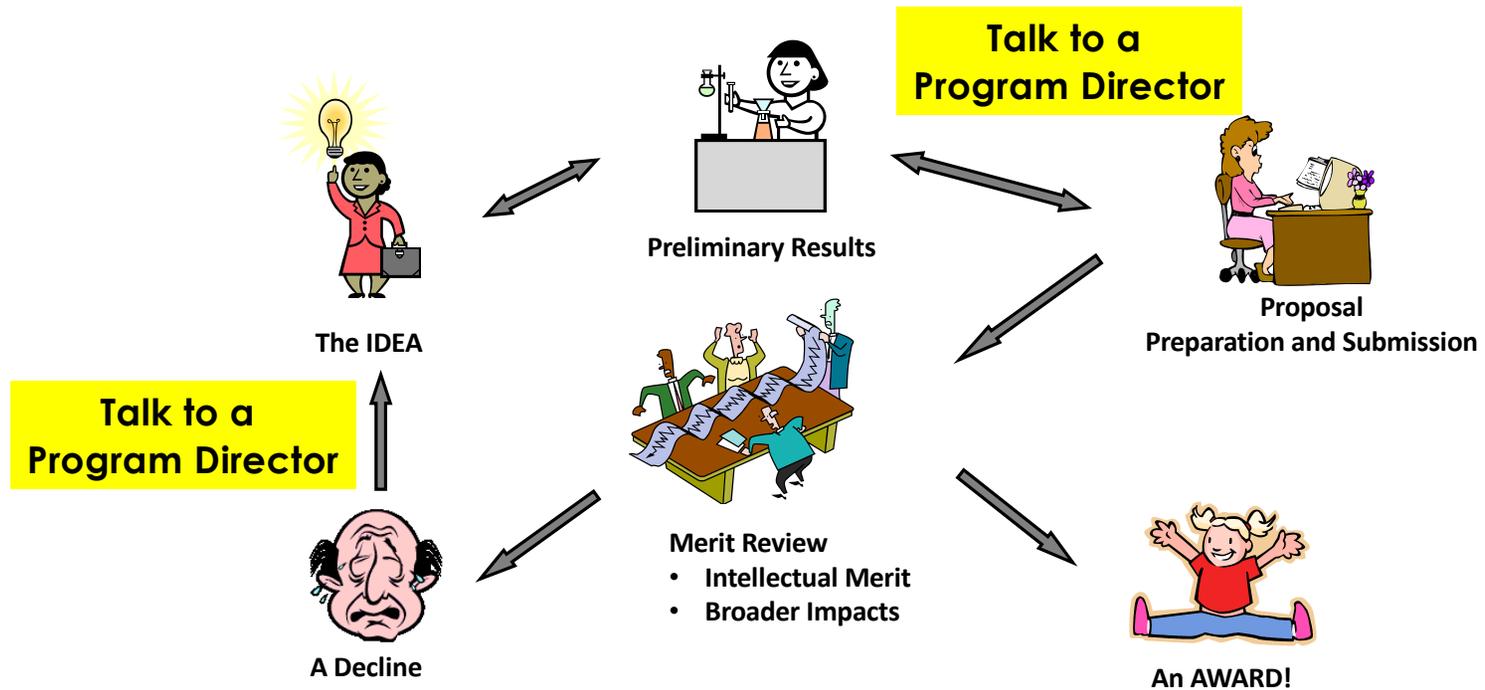
- Potential to advance knowledge
- Qualifications of the investigators
- Creativity and originality
- Organization of the ideas/experiments
- Access to resources
- Potentially transformative research?

Broader Impact:

- Promoting teaching, training, and education
- Enhancement of infrastructure for research and education
- Community resources and outreach
- Participation of underrepresented groups
- Benefits to society



Proposal Cycle from PI's Perspective



Panel Rating Categories



OUTSTANDING

- Strongest in both Intellectual merit and Broader impacts
- Most innovative and bold

HIGH PRIORITY

- Strong in both Intellectual Merit and Broader Impacts
- Innovative and bold
- Only minor issues

MEDIUM PRIORITY

- Potentially strong in both Intellectual Merit and Broader Impacts *but*
- One or more issues dampen enthusiasm

LOW PRIORITY

- Significant weaknesses in Intellectual Merit or Broader Impacts, or both *and/or*
- Likely to have **incremental impact** (i.e., confirmatory work)

NON-COMPETITIVE

- Seriously flawed in Intellectual Merit or Broader Impacts *and/or*
- Missing crucial elements related to these merit criteria



How to Get Started...

- Think **broadly** about what basic scientific questions your research might address
- Consider what Broader Impact activities you **want** to propose
- Peruse the NSF website (www.nsf.gov) to identify likely programs
- Contact a Program Director **before** you submit a proposal
 - Email a one-page synopsis of your research idea ([tips for synopsis](#))
 - Ask for feedback; **we are here to help!**



What Makes a Proposal Competitive?

The Good

- Potential for **high impact-Important**, not just Interesting.
- New, **original** ideas
- Focused, feasible project plan
- Articulated knowledge of subject area, published relevant work
- Experience in essential methods or approaches, and/or collaborator expertise
- Sound scientific rationale
- **Realistic** amount of work; sufficient detail; critical approach (pitfalls and alternative hypotheses considered)
- **Well written** and understandable to someone not working directly in the field



Advice for Writing an Excellent Proposal

More Good!

- Start early!
- Read the solicitation!
- Identify your **audience**
 - Balance between general and specific subject area knowledge
- Frame a **big picture**
- Identify significant needs, gaps, and **hypotheses**
- Describe the plan to address the needs, gaps, and hypotheses
- Emphasize **creative** or innovative aspects
- Provide **proof-of-concept**
 - Preliminary data- especially if approach is new to you, or the field
- Speak with a Program Director
- Reread the solicitation



Additional Excellent Features

- **Expected outcomes** are described
 - Unexpected outcomes considered
- Outcomes explicitly related to original Goal(s)
- Ideally, negative results should be interpretable and meaningful
- Recognition of Reviewers
 - **Easy to read**
 - Neat and tidy
 - Budget is reasonable
 - All relevant and current literature is cited
 - You can (and should) suggest reviewers



Common Mistakes: Scientific

The Bad

- Work is too close to what has been done before - i.e., **incremental advance** or limited impact
- Project has too large a **scope** or is too narrowly focused to be exciting
- Proposed methods / research plan will not yield results that address the stated goals of the project
- Experimental / theoretical / analytical design is **flawed**
- Aims are **interdependent**
- Failure to be **transparent** in writing
 - Disconnect between what you are Thinking and what the Reviewer Reads
- Medically motivated
 - Careful, OK to mention disease in Broader Impacts



What You Don't Want to See in Your Reviews

The Ugly

- The PI has not been very productive either during or since the Ph.D.
- The proposal is naïve / overly ambitious
- Potential pitfalls and alternate strategies are not described
- Alternate interpretation of data is ignored
- PI has failed to cite essential literature
- Necessary resources are not available, or the PI does not have demonstrated expertise
- Proposal is Strong in Intellectual Merit, but Broader Impacts are weak



Common Mistakes: Failure to Follow Guidelines

More Ugly!

- Essential documents are missing
 - Departmental letter (if required)
 - Letters of collaboration
- Letters of collaboration are non-compliant
- Extraneous documents are included
- Document is not easy to read
 - Margins too narrow
 - Font size too small
 - Figures too small or low res. / legends lack detail
 - Excessive use of acronyms
- Sloppy
 - Typos, misspellings, incorrect figure placement
 - Conversion from Word to PDF is inaccurate



**DON'T
wait
until the
last
minute**



Some Notes on Broader Impacts

- It's not a formula
 - Do something that **interests you**, has measurable outcomes, and matches the time you are willing to devote
 - Go above and beyond what you are already paid to do
- Ask for money if you need it
- Use **existing infrastructure**, as appropriate - Don't need to reinvent
 - But...Give, as well as take - Build on something that works at your institution
 - Realize that institutions certify to support your efforts
- How will you know the activities have the intended outcome?
 - Ask for help with **assessment**
- See resources at Center for Advancing Research Impact in Society (ARIS); researchinsociety.org - Sign up for June 7th VOH -



What about Medical Research?

- Biological research on **mechanisms of disease in humans**, including on the etiology, diagnosis, or treatment of disease or disorder, is **normally not supported**.
- Biological research to develop **animal models** of such conditions, or the **development or testing of procedures for their treatment**, also are **not normally eligible for support**.
- **However, use-inspired basic research** with societal benefits (such as future implications for human health) **can be supported**.
- For example, research on:
 - Mechanisms of DNA damage and repair – **YES**
DNA repair pathway/enzyme as drug target – **NO**
 - Fundamental questions about viral structure, replication, evolution, etc. – **YES**
Therapeutic interventions against infection – **NO**
 - Mechanisms underlying cell motility – **YES**
Metastasis of tumor cells – **NO**

NSF Proposal & Award Policies and Preparation Guide
([PAPPG 23-1](#))

Contact a Program Director!
(send ~1-pg summary)

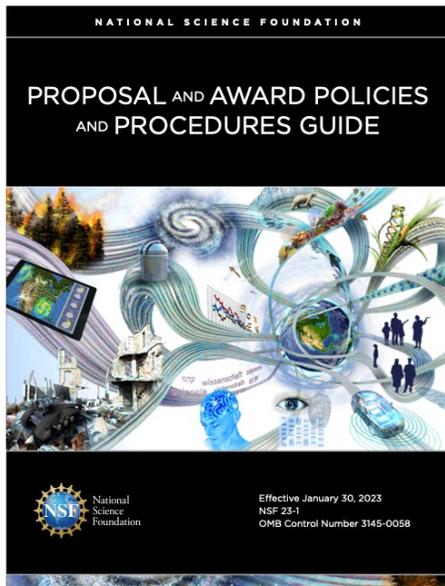


New requirements!

New PAPPG 23-1 is in Effect

NSF 23-1 - effective date January 30, 2023

Summary of Changes: <https://beta.nsf.gov/policies/pappg/23-1/summary-changes>



- **Safe and Inclusive Working Environments for Off-campus/Off-site Research:** After April 18, 2023, **BIO and GEO proposals** that involve off-campus or off-site research must submit a plan for safe and inclusive research ([PAPPG II.E.9](#)). This requirement reflects NSF's efforts to foster safe and harassment-free environments wherever science is conducted. [Feb 7th, 2023, webinar recording](#).
- **Potential Life Sciences Dual Use Research of Concern (DURC):** Proposals that could potentially be considered DURC or involve enhanced potential pandemic pathogens must self-identify and comply with US Govt. policy requirements ([PAPPG II.E.6](#)). Governed by policies released in [2014](#) and [2017](#).
- **Biographical Sketch and Current and Pending Statement:** After October 23, 2023, biosketches and C&P statements must use SciENCv format ([PAPPG II.D.2.h](#)).

NSF 23-1: [FAQ](#)



Declination is a Part of the Process

- Stay **Calm** and Do NOT Get Discouraged!
 - Read the reviews and Panel Summary more than once
 - Ask others to interpret the reviews for you
 - Reflect on your next moves after you have had time to digest the feedback (Reviews, Panel Summary, PD Comments, Context Statement)
 - **Contact your Program Director**
- **Resubmit** after addressing significant weaknesses
 - Do you need more preliminary data?
 - What were the common themes in the reviews?
 - Is one component better than another?
 - Are there significant strengths that you can build upon for resubmission?



Next MCB Virtual Office Hours

- Wednesday May 10th, 2023, 2-3 pm ET
Faculty Early-Career Development Program
(CAREER; [NSF 22-586](#))
- Wednesday June 7th, 2023, 2-3 pm ET
Let's Talk Broader Impacts



SCIENCE HAPPENS HERE

Share your story!

#NSFstories

Join NSF in highlighting your amazing research, discoveries, innovation and more happening across the country and around the world.

- ✓ Tag your location and use our IG filter, graphics or simply post a photo or video with #NSFstories
- ✓ We will amplify your posts and share your stories. We will also share your stories at events, hold competitions, feature on our blog and more!

[Toolkit: nsf.gov/ScienceHappensHere](https://www.nsf.gov/ScienceHappensHere)



NSF

SCIENCE
HAPPENS **HERE**

 **Cape Royds,
Ross Island, Antarctica**

#NSFstories

